USDA NRCS
United States Department of Agriculture
Natural Resources Conservation Service

Seasonal High Tunnel System for Crops

Iowa Job Sheet

Natural Resources Conservation Service (NRCS)
Des Moines, Iowa

Iowa Conservation Practice 798
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Definition

A seasonal high tunnel is a polyethylene-covered structure with or without electricity, heating, or mechanical ventilation systems. High tunnels modify the climate to create more favorable growing conditions for vegetable and other specialty crops grown in the natural soil beneath it. The structure utilizes passive solar heating and can use a supplemental heating system, if required. Ventilation is usually provided by manually rolling the sides up or down. However, mechanical systems may be used to improve effectiveness. High tunnel systems are not greenhouses.

Purpose

Tunnel systems are designed to extend the cropping season and benefit natural resources by improving plant quality, soil quality, and water quality through methods such as reduced nutrient and pesticide transport.

General Specifications

» The structure, including post ribs, or hoops, purlins, ridgepole, coverings and all other components are constructed and anchored according to the manufacturer's recommendations.

» Tunnel systems are commercially available in many lengths, widths and designs. The width of a tunnel should not exceed 30 feet and has a minimum height of 6 feet. It should be tall enough to allow spraying, cultivation, harvest and other operations to occur with the tunnel intact.

Photo by Jerry DeWitt
Plymouth County, IA

Photo courtesy of AgMap

» Tunnels are to be placed in sites with adequate drainage in full sun and, if possible, with protection from the wind. The orientation of the tunnel is dependent on the season and crops that will be grown. Usually, a north-south orientation will optimize sun exposure.

» Ventilation is important to moderate temperature within the tunnel. Ventilation is provided by rolling up the sides of the tunnel, and is greatly influenced by the height of the structure. Taller structures allow for better airflow. Mechanical ventilation systems can be used for temperature regulation and improving airflow.

» It is important to design the structure to match the local snow and wind condition.

» The baseboard should be treated lumber or rot-resistant wood. *(Note: Treated lumber may not be acceptable in organic production. Please check your organic plan for acceptable material.)*

» The plastic covering of the tunnel should be a minimum 6 mils thick, greenhouse grade, & UV

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resistant polyethylene.

- Allow for good surface water drainage. The minimum spacing between structures with north-south orientation should be 4 feet. East-west orientation requires a spacing of 2 times the structure height.
- Water runoff from the high tunnels or other nearby sources can cause erosion, ponding and drainage problems that may require the application of other conservation practices. Additional practices, such as diversions, grassed waterways or critical area seeding, must be planned and installed as a condition for the installation of a high tunnel system.
- All disturbed areas need to be seeded to control erosion.
- Raised beds of natural soil are allowed in the high tunnel, but structures such as growing tables, permanently formed beds and potted plants are not.

Operation and maintenance

The seasonal high tunnel system for crops will be maintained for a minimum of 4 years. High tunnels are intended to be "seasonal" structures which are not designed to sustain heavy snow loads. The participant will decide if the cover will be removed in the "snow season." Regardless of the decision to seasonally remove the plastic covering, each participant is responsible for repairing and/or replacing damage from wind, snow or other normal weather-related occurrences for the four-year lifespan of the structure. The plastic covers should be inspected regularly for wear and tear. Tears in the plastic should be repaired immediately.

Surface and subsurface drainage and other associated conservation practices must be maintained - drainage problems near the tunnel shall be corrected. Accumulated snow should be periodically removed to avoid structural weakening and/or collapse.

Plans and Specifications

The plans and specifications for seasonal high tunnels shall be in accordance to this job sheet and the manufactures recommendations. Prepare the site according to manufacturer's recommendations.

References

- Section 4 Field Office Technical Guide
- Iowa High Tunnel Fruit and Vegetable Production Manual, ISU Extension, Sept. 2009

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Tunnel System Job Specification Sheet

Name _____ **Farm #** _____ **Tract #** _____

Assisted by _____ **Field Office** _____ **Contract #** _____

Tunnel information

Manufacturer _____ Model _____

Height (min 6') _____ Width (max 30') _____ Length _____ Total square feet _____

Materials

Cover—Polyethylene a minimum of 6 mils thick

Ribs purlins, post and other components (size and type of materials)

_____

Optional Systems Planned

☐ Supplemental Heating System ☐ Mechanical Ventilation System ☐ Electrical System

Location and Tunnel Orientation (Show on site plan map)

Other required conservation practices planned (Show location on site plan map)

☐ Diversion ☐ Grassed Waterway/Swale ☐ Critical Area Seeding

☐ Infiltration Trench ☐ Irrigation ☐ Other

Seeding recommendations for erosion control on disturbed areas:

Species and rate to be planted _____

_____

Lime _____lbs/ac. Fertilizer _____ lbs of 5-10-10 /ac.

Certification

This structure was constructed and installed using all manufactures recommendations. I have read and understand the operation and maintenance requirements associated with this practice. I understand that electrical, heating and mechanical ventilation are not eligible for financial assistance.

_____ Date _____

Landowner

_____ Date _____

Technical Service Provider (if applicable)

REQUIRED: Attach a site plan map.

SUPPORTING PRACTICES MEET NRCS SPECIFICATIONS

_____ _____

NRCS Date

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Attach Site Plan Map